

Projectile Motion Simulation  
Honors Physics

29 Points Total

Instructions:

1. Open the simulation by going to [www.phet.colorado.edu](http://www.phet.colorado.edu); play with sims; physics; motion; projectile motion; run now.
2. Variables you may change: Launch angle, initial speed, object launched.
3. Variables measured by the simulation: Range, height, time, displacement (by the measuring tape).
4. Experimentally determine five different angle/initial speed combinations that have the object hit the target.
5. Perform one calculation to determine one of the five angle/initial speed combinations in #4. Choose the time needed to hit the target, and measure the  $\Delta x$ .
6. Change the target's  $\Delta x$  and  $\Delta y$ , and again experimentally determine five different angle/initial speed combinations that have the object hit the target.
7. Again, perform one calculation to determine one of the five angle/initial speed combinations in #6.
8. Change the height of the cannon and the target's  $\Delta x$  and  $\Delta y$ , and again determine five different angle/initial speed combinations that have the object hit the target.
9. Again, perform one calculation to determine one of the five angle/initial speed combinations in #8.

Rubric:

1. Data tables (15 points; 5 points each): First table for Instruction #4, second table for Instruction #6, and third table for Instruction #8.
2. Calculations per Instructions #5, 7, and 9 (9 points; 3 each).
3. What is the relationship between launch angle and initial speed? (2 points)
4. Conclusion sentence(s) (3 points).